MISCELLANEOUS.

On the Earliest Stages in the Development of Sessile-eyed Crustacea. By M. Louis Roule.

I have had the honour of communicating to the Academy several of the most important phenomena presented by the sessile-eyed Crustacea in the course of their embryogeny; some more recent investigations enable me to complete the knowledge already acquired and to prepare a synthesis of the first stages of the development, taking as types *Asellus aquaticus* and *Porcellio scaber*.

The ovule is always rich in nutritive vitellus; nevertheless the bulk occupied by the latter varies according to the species. When it is least in amount the fertilized ovum undergoes a total and radial segmentation, the segments assuming the well-known form of cones, of which the apex is turned towards the centre of the ovule and the base towards the periphery; on the contrary, when its quantity is considerable, as in *Porcellio* for instance, this preliminary segmentation is not manifested. But, whatever be the mode exhibited, after the radial division when it exists, or from the moment that the ovum is mature when it does not appear, the formative vitellus ("vitellus évolutif") does not remain mingled with the nutritive vitellus, but separates from it. This separation does not manifest itself at the same time throughout the ovum; it commences in a zone which corresponds to the future anterior extremity of the embryo. The formative vitellus forms in the first place in this region a little cicatricle, which rapidly organizes itself into cells, to which the nuclei are furnished by the conjugated nucleus, which results from the fusion of the male and female pronucleus effected in fertilization. Fresh quantities of formative vitellus then become isolated from the nutritive vitellus and added to the cicatricle, increasing its mass and dividing likewise into cells; in this way the cicatricle grows and gradually envelops the nutritive vitellus, advancing with regularity from the zone which it occupied until it reaches the pole diametrically opposite; a cellular layer is extended by this proceeding upon the periphery of the ovule, and finally surrounds it.

Arrived at this stage of development, the embryo is constituted by a layer of cells which surrounds a compact mass of nutritive vitellus; this layer is the blastoderm, which will give rise to the three blastodermic layers. To this end the cells of the blastoderm produce a large number of cellular elements, of which some penetrate into the nutritive vitellus, while the rest intercalate themselves between the latter and the blastodermic layer; the development of the two kinds of cells is similar. Several of these elements, collected in two groups placed at the sides of the embryo and not far from the medio-ventral line, arrange themselves in two symmetrical layers which penetrate into the nutritive vitellus, converging towards one another; these two layers, separated from the time of their first appearance, represent the rudiments of the endoderm. The other elements do not arise in limited zones; they are produced by the blastoderm throughout its entire extent, and give rise to the meso-

derm. When the blastoderm has thus given birth to the mesoderm and endoderm, it persists as a simple cellular layer around the layers which arise from it, and constitutes the ectoderm. In short, the primitive blastoderm is alone the origin of the three layers ; the cells of which it is composed multiply rapidly, and group themselves in two different ways ; some remain at the periphery and will form part of the ectoderm, while the rest penetrate into the ovule and represent a meso-endoderm, which will differentiate into the two final inner layers.

One of the most important facts is the diffuse genesis of the mesoderm by almost the entire blastoderm : a second is the double origin of the endoderm, the two original zones being separated by a vast space. These two peculiarities taken together are really characteristic, for we do not meet with them in the condensed developments of the rest of the Cœlomata. Finally, a concluding phenomenon of great value is presented by the enteron or primitive intestine, which hollows itself out in the interior of the embryo without in any way proceeding from a gastrular invagination, and does not even present a trace of such a primordial origin ; here, again, is a contrast to the condensed developments of the other Cœlomata. At the present moment I am continuing my investigations and extending them to the Podophthalmata ; I shall shortly have occasion to show that they exhibit the same phenomena as the Edriophthalmata, and that the blastodermic depressions, considered by divers authors, by Reichenbach and Bobretzky among others, as gastrular invaginations, have not, in reality, such a significance.—*Comptes Rendus*, tome cxiii. no. 24 (December 14, 1891), pp. 868–870.

A new Mode of Respiration in the Myriapoda. By F. G. Sinclair (formerly F. G. Heathcote), M.A., Fellow of the Cambridge Philosophical Society.

The Scutigeridæ respire by means of a series of organs arranged in the middle dorsal line at the posterior edge of every dorsal scale except the last.

Each organ consists of a slit bounded by four curved ridges, two at the edges of the slit and two external to the latter. The slit leads into an air-sac. From the sac a number of tubes are given off ; these tubes are arranged in two semicircular masses. The ends of the tubes project into the pericardium in such a manner that the ends are bathed in the blood and aërate it just before it is returned into the heart by means of the ostia. In the living animal the blood can be seen through the transparent chitin of the dorsal surface surrounding the ends of the tubes ; and in the organ and surrounding tissues cut out of a Scutigera directly it is killed, the blood-corpuscles can be seen clustering round the tube ends. If the mass of tubes of a freshly killed specimen are teased out under the microscope in glycerine, they can be seen to be filled with air. The tubes each branch several times. Each tube is lined with chitin, which is a continuation of the chitin of the exo-skeleton. Each tube is also clothed with cells, which are a continuation of the hypodermis. The tubes end in a blunt point of very delicate chitin.